



# Pictologics and its Effects on English Vocabulary Learning of Malaysian Students with Reference to the Schema Theory

 **Abolfazl Shirban Sasi**

*TransWorld University, Taiwan*

**Corresponding Author:** Abolfazl Shirban Sasi

**Phone:** +886919456970

**e-mail:** pictologics@gmail.com

**Article citation:** Shirban Sasi, A. (2019). Pictologics and its effects on English vocabulary learning of Malaysian students with reference to schema theory. *Applied Linguistics Research Journal*, 3(1), 48-62

**Received Date:** 18-9-2018

**Accepted Date:** 8-12-2018

**Online Date:** 18-3-2019

**Publisher:** Kare Publishing

© 2018 Applied Linguistics Research Journal

E-ISSN: 2651-2629

## ABSTRACT

This study investigated the effects of Pictologics (PLS) method developed by Author (2004) on English vocabulary learning by Malaysian year six primary school students (N=118). It also examined the probable gender differences (N=54,  $p \leq .01$ ). In a pretest-posttest control-group design, students in two public schools in Penang, Malaysia, participated in this experiment. They were almost equally divided into the treatment group which received their training with PLS, and the control group that received their training via a conventional method. A 50-item TOEFL vocabulary test was the instrument. The data revealed that students under PLS obtained a significantly higher gain score in the vocabulary test. However, the difference between the vocabulary gain score between the male and female students in the treatment group was not significant. Briefly introducing PLS in light of the schema theory, this paper encourages teachers to be trained and students be taught to sufficiently use the PLS techniques to enhance teaching and learning English vocabulary.

**Key words:** Gender, Pictologics, PLS, Schema theory, Vocabulary

## 1. Introduction

Being the corner stone of any language, words are probably the first and the most important segments any language learner may be after. When talking about teaching/learning vocabulary in any given language, it is essential to pay enough attention to the juxtaposition of similarities/commonalities and the differences/contradictions among different languages. Then, from another perspective, if we suppose that any course or lesson plan has three main components; that is to say, teacher(s), students, and the teaching material, then we can think of and, subsequently, sustain the best causal informative relations among them. In nourishing this view point, the mainstream English language teaching methods seem to be, at least to some extent, not fully functional. Problems such as easily forgetting words, misunderstanding word meanings, misspelling or mispronouncing the vocabulary, lack of sufficient input or/and output, rote learning, etc. seem to be still there in the realm of English language education. In this regards and in the current paper, the author is trying to introduce a new way of looking at the existing problems. Pictologics or PLS is a new language teaching method that basically relies on the imaginative usage of a picture or picture combinations in order to associate pieces of linguistic forms (such as vocabulary) to the students' a priori knowledge of the world via pictures.

## 2. Literature review

### 2.1 A brief introduction to Pictologics Method

#### 2.1.1 Background

Pictologics (PLS) is a newly-developed teaching method which has been tried with Iranian, Korean, Malaysian, and Taiwanese language learners. This method is based on the following assumptions (Author, 2004):

The human mind is capable of thinking about almost anything.

There is no limit to our imagination.

We can perceive the world around us with at least one of the five senses of **hearing, sight, smell, taste, and touch**.

With just a few pictures, we can have endless combinations of pictures by which we can make/utter/write (communicate) endless structures/pieces of information.

#### 2.1.2 Definition

The term **Pictologics** is made of three parts: **picto, logic, and s**. S is a suffix which gives the whole word a noun form. **Picto** is the short form of 'picture'. This has two meanings: as a noun, it means pictures of different subjects such as people, nature, animals, food, signs of technology, different places, etc. Totally, there are just 300 pictures that are used for all levels. 'Picture' as a verb means to 'visualize' or to 'imagine'. What we do in the classes is, to teach the language learners how to control and then benefit from their imagination. To do so, we first teach the students to pay attention to their more concrete senses: sight, hearing, smell, taste, and touch. Then **Logic** means 'whatever word(s) or pieces of information that we can associate -directly or indirectly- to a certain picture or/and set of pictures picked randomly'.

#### 2.1.3 Number of possibilities

If language practitioners learn to make imaginary connections between linguistic forms and a picture or picture combinations, and if they learn to make the best of their five senses, then they can produce many structures. That is, when we use more than one card at a time and make random combinations of two, three, four, and ... cards, then we will have a very large number of combinations. Therefore, there will be chances for the students to produce (both oral and written) structures, and chances for the teachers to monitor the process.

The following formula is applied:  $\binom{n}{m} = \text{Total number of possible combinations of cards} = \frac{n!}{m!(n-m)!}$

Where n= total number of the cards, m= number of the cards picked together at a time, and "!" means the figure should be multiplied by all the digits preceding it.

Assuming we just use 20 pictures, then we will have more than two million possibilities each of which can be a good source for language production (Author, 2004).

#### 2.1.4 What matters?

Look at the following picture in Figure 1 and see what words or expressions are connected to it. It is simply a picture of a bird. One might think this is so unimportant or trivial to learn much from. However, even ordinary subjects can open doors to complex connections in PLS. Table 1 shows how easy it is to think about these words, directly or indirectly:



Figure 1. Any picture of any bird

Retrieved from Internet public domain (n.d.).

**Table 1***Examples of Words Associated Imaginatively to a Simple Picture*

<b>Word associated to the picture</b>	<b>Why this word is connected to the picture (the “logic”)</b>
animal	A bird is an <b>animal</b> .
live	Birds <b>live</b> in many places.
forest	Many birds live in <b>forests</b> .
beautiful	Many believe that birds are <b>beautiful</b> .
fly	Birds <b>fly</b> well.
sing	Birds also can <b>sing</b> .
night	You may not hear most birds at <b>nights</b> .
eye	Birds usually have big <b>eyes</b> .
insect	Most birds eat <b>insects</b> .
egg	Birds lay <b>eggs</b> .
lay eggs	Birds <b>lay eggs</b> .
hatch	After some days, little chicks <b>hatch</b> .
skin	A bird’ <b>skin</b> is covered by feathers.
skeleton	Birds have a very light <b>skeleton</b> .
descendent	Birds may be the <b>descendants</b> of dinosaurs.
hibernate	Birds do not <b>hibernate</b> .
summer	Most birds lay eggs during <b>summer</b> .
snake	Some <b>snakes</b> hunt birds.
hunt	Some birds <b>hunt</b> snakes.
nest	Most birds <b>nest</b> on trees.
camouflage	Birds <b>camouflage</b> well in the nature.

As illustrated, we could connect more than 20 words or expressions to this seemingly unimportant picture. Almost everybody can add many more words to the same picture. Therefore, we should remember that nothing is trivial in this world, and that by a little concentration we can learn a lot because every one can imagine and then think of some sort of connections. Please also see (Author, 2003, 2004, 2006, 2008, 2009, 2012, 2013, 2017, and 2018).

## **2.2. A brief introduction to the Schema Theory**

According to Rumelhart and Ortony (1977), the term “schemata” finds its way into modern psychology from the writings of Bartlett when asserting that the schema represents an active organisation of past experiences which is used to structure and interpret future events. Rumelhart (1980) also quotes Immanuel Kant’s definition of this notion (pp.33-34), “Anyone of certain forms of rules of the ‘productive imagination’ through which the understanding is able to apply its ‘categories’ to the manifold of sense-perception in the process of realizing knowledge or experience.” On the other hand, Moseley et al. (2005) explain Piaget’s two notions

of assimilation, and accommodation in terms of existing schemata. According to them, Piaget argued that cognitive development becomes necessary when present cognitive structures are incapable of reconciling conflict between existing understandings and current experience. Thus, Cognitive restructuring involving the development of more sophisticated schemata is the natural outcome. According to Tardieu and Gyselinck (2003), one of the functions of long-term memory is to store automatized schemata. These schemata are complex, cognitive constructs that permit the learners to categorize information in simple, easily retrievable units. With practice and time, the cognitive processes gradually become routine. Also, Donovan et al. (2003) argue that abstracted representations do not stay as isolated occurrences of events but become elements of larger, related events, or schemata. Knowledge representations are built up through many opportunities for observing similarities and differences across diverse events. They continue, "Memory retrieval and transfer are promoted by schemata because they derive from a broader scope of related instances than single learning experiences" (p.66). Halpern (2003) describes that we use our existing knowledge when we receive new information. Thus, the acquisition of knowledge is an active mental process. Each individual builds "extensive knowledge structures" that connect new ideas to what is known so that knowledge is always personal and somewhat idiosyncratic. These knowledge structures or schemata are our personal internal representations about the nature of the world. Stieglitz (1983) claims that previously acquired concepts and experiences help students in becoming successful in their language learning. In schema-based models of comprehension (Rumelhart, 1980; Rumelhart & Ortony, 1977; Van Dijk & Kintsch, 1983) the construction of mental representations depends on associative networks of abstract propositions.

### **2.3. Related studies**

#### *2.3.1. Learning vocabulary*

Various studies have shown that new words can be stabilized more efficiently by heavier involvement load. Newton (2001) argues that although in task-based approaches, learners will often ignore difficult vocabulary in order to maintain communicative goals, such encounters can be turned to the learners' advantage. That is, rather than remove difficult words, teachers should consider a number of cooperative options for exposing learners to the new words. Van Daalen-Kapteijns, Elshout-Mohr, and De Glopper (2001) studied how children derive the meaning of unknown words from multiple contexts. The study showed that even young students of low verbal ability are able to perform meaning-derivation activities that are generally expected from mature students of high verbal ability. Then, in an attempt to explore the possibility that the L1 and L2 mental lexicon might be structurally similar, Wolter (2001) compared the L1 and L2 mental lexicon storage and has proposed an alternative model to combine the depth of word knowledge and the breadth of word knowledge (vocabulary size). Jiang (2002) inspected the notion that L2 lexical forms are often mapped to the existing semantic content of their first language equivalents rather than to new semantic properties of their own. The conclusion was that L1 semantic contents are present in L2 lexical entries. Also, Celik's (2003) study of teaching vocabulary through code-mixing (the use of L1 word in an L2 utterance), found this technique very effective with intermediate Turkish university EFL teacher trainees. Barcroft's (2004) experiment examined the effects of word writing on second language vocabulary learning. The results revealed that productive vocabulary learning on immediate and delayed measures was higher in the no-writing condition. Thus to learn new words, students should allocate sufficient processing resources towards encoding the target word form, isolating an appropriate semantic representation, and mapping word forms onto the semantic representation. Mirhosseini Chahardeh, and Khorasani (2018) explored the effects of pre-teaching new vocabulary through audio-visual tools on EFL students' reading comprehension skill in Iran. They examined 30 male and female intermediate level students from a language institutes during five sessions in a summer course. They concluded that pre-teaching new vocabulary items via audio-visuals has positive effects on the Iranian EFL learners' reading comprehension ability. Webb (2005) investigated the effects of reading and writing on word knowledge as receptive and productive ways of vocabulary learning. The results showed that, the reading task was superior when the same amount of time was spent on both tasks. However, the writing task which requires more time, was more effective. Webb recommends the use of productive vocabulary learning tasks over receptive tasks. Hoai Huong (2018) studied EFL university students' strategies for learning academic English words. The subjects included 132 EFL university students. The results showed that the students had the tendency to use on-line dictionaries and other apps more than cognitive strategies when learning academic terms. In another study, Sagarra and Alba (2006) investigated the effectiveness of three methods of learning vocabulary; namely, rote memorization, semantic mapping, and the keyword method. They found out that the elementary L2 learners gain more from the keyword method than from rote memorization, and that semantic mapping resulted in worse retention than rote memorization and the keyword method. In another study, Nasrollahi and Samran (2018) investigated the

effects of visual contextual support and glossary of words on EFL learners' vocabulary learning. They randomly assigned 60 male pre-university students to three homogeneous groups. One group was exposed to visual contextual support, and another to glossary of words; while the third group was a control one. The results of their study revealed a significant improvement of vocabulary learning via using visual contextual support in comparison to the group exposed to merely a glossary of words and the control group. Also, Mizumoto and Takeuchi (2009)'s study revealed that explicit instruction of vocabulary learning strategies results in improved vocabulary test scores, though little change was witnessed among advanced learners. They claimed that some of these strategies are quickly rejected because of their time-consuming nature, or being perceived as inefficient in other ways. In another study on the effects of receptive and productive learning of word pairs, Webb (2009) experimented with Japanese native speakers. Webb found out that productive learning of word pairs enabled learners to gain significantly greater knowledge of both receptive and productive knowledge of orthography, and productive knowledge of meaning, syntax, and grammar. He concludes that teachers must encourage productive learning of vocabulary if they want to enhance students' both receptive and productive knowledge. Moreover, in a study on textbooks and vocabulary knowledge, Brown (2010) found that an approach that intentionally tried to consider different aspects of vocabulary knowledge could provide a structural basis for the recycling and repetition of vocabulary items. Additionally, incidental learning is still required to truly secure the items and fully supplement the learners' knowledge of them. Hoshino (2010) believes that although a number of studies have revealed that incidental vocabulary learning does happen, intentional learning brings about greater retention. In another study, Shintani (2011) compared the effects of input-based and production-based instruction on vocabulary acquisition. This study concluded that input-based provided opportunities for richer interaction for learners than production-based. The results also showed that the input-based instruction provided opportunities for learners to produce, and the production-based instruction also provided opportunities for learners to comprehend input. In another study to explore the impact of teaching vocabulary learning strategies on short-term and long-term retention of the items, Nemati (2013) resulted that "grouping" seemed to be an effective strategy for all proficiency level language learners. Finally, in a research on comparison between the strategies of good and weak students, Rojananak and Vitayapirak (2015) found out that good language learners depend heavily on bilingual dictionaries for their English vocabulary learning. In conclusion, it could be assumed that a very essential part of learning a new language is mastering the vocabulary of that language, and that there are a large variety of ways to do that.

### *2.3.2. Gender differences in language learning*

Studies on the differences between female and male ESL/SFL learners have revealed some valuable observations which should be considered in order to strengthen and enrich future educational programs. Grace's (2000) study showed that there is no significant difference between males and females concerning the performance on the receptive vocabulary tests, either immediately or after a delay of two weeks. The study also revealed that there were no significant difference in the amount of time females and males spent in finding the translations, suggesting that males and females can equally benefit from Computer assisted language learning (CALL) programs. Yang (2001) studied the relationship between gender and language proficiency differences in the color-naming performance of Chinese-speaking English learners at the university level. Yang found that females possessed a larger color vocabulary than males, and also that they had a tendency towards a wider aesthetic range of colors as well as accuracy in using them. A study by Phakiti (2003) on gender and strategy use in L2 reading, found that there were no gender differences as far as the reading comprehension performance and use of cognitive strategies is concerned. The research, however, revealed significantly higher use of metacognitive strategies for males. Varol and Yilmaz (2010) postulated that the recent researchers have the tendency to consider equal abilities between males and females with respect to language, language learning, and various analytical and mathematical skills. However, their own study showed that regarding preferences for autonomous activities, female students apparently took more opportunities. Yilmaz (2010)'s study on the students' gender differences with respect to learning strategies revealed that females use more effective strategies than males do. Finally, in a study on gender differences in adult word learning, Kaushanskaya, Marian and Yoo (2011) found out that female learners outperformed male learners when learning phonologically-familiar words, but not when learning phonologically-unfamiliar words that fit the English phonological system. However, both female and male learners performed similarly when learning phonologically-unfamiliar words that diverged from the English phonological structure.

### 3. Research Questions and Hypotheses

#### 3.1 Comparison of the English vocabulary learning gain score in the groups

1- Is there any significant difference between the English vocabulary learning gain score by the Malaysian year six primary school students using PLS and the English vocabulary learning gain score by the other Malaysian year six primary school students using a conventional method?

$H_0$ 1- There is no significant difference between the English vocabulary learning gain score by the Malaysian year six primary school students using PLS and the English vocabulary learning gain score by the other Malaysian year six primary school students using a conventional method.

$H_1$  - The Malaysian year six students who are taught with PLS will have higher English vocabulary learning gain score than the Malaysian year six students who are taught with a conventional method.

#### 3.2 English vocabulary learning by PLS and students' gender

2- Is there any significant difference in the English vocabulary learning gain score by the Malaysian year six primary school between male students and female students using PLS?

$H_0$ 2- There is no significant difference between the English vocabulary learning gain score by the Malaysian year six primary school male students and female students using PLS.

### 4. Research design

#### 4.1 Preview

A Pretest-Posttest Control-Group design, as defined in Creswell (2003, p170) was adapted for this study. Then, to avoid probable researcher's bias, the Author trained some native Malaysian primary school teachers to learn how to use the PLS method in their English classes. This was conducted through a workshop.

#### 4.2 Sampling, training English teachers, and treatment procedure

Based on Author's consultations with some Malaysian primary and secondary school teachers, two public primary schools in the Bukit Mertajam district (approximately 10 km. from the Penang Bridge in the Mainland Malaysia) were chosen based on their almost being representative of typical Malaysian public primary schools. The details follow:

All the necessary permissions from the Educational Planning and Research Division of the Malaysian Ministry of Education (EPRD), the State Educational Department (JPN), as well as the school principals were obtained.

The two public primary schools were randomly assigned to the treatment and control groups by flipping a coin.

All the ten teachers of English in the treatment school were trained by the Author to learn how to use the PLS method during a 2-session workshop. (The teacher of the control group was not invited to this workshop in order to avoid teacher contamination).

The selected teacher for the PLS method was privately instructed for more details in three more sessions.

There were five Year Six classes in the treatment school and three in the control school. Based on the records of their achievement levels, these classes were ranked from A to E in the treatment, and A to C in the control school. Thus, in order to have access to a representative sample, the highest and the middle rank achievers in both schools; that is to say, classes A and C from the treatment school and classes A and B from the control school were selected for the experiment. There were 30 to 35 students present in each class.

Both groups were exposed to the treatments for ten 1-hour sessions held twice or thrice a week. The classes were held mostly during the morning hours for both schools.

#### 4.3 The control group

In order to have a better base of comparison between the application of PLS and the already existing language teaching methods in the Malaysian primary schools, the control group was exposed to a non-PLS method. They were taught by a local teacher. Then, as far as the integration of the teaching material (50 TOEFL words) into the existing material/method is concerned, the researcher incorporated all these words into the source which these students were going to study in a near future, that is, *English Form One Textbook*. The

reasons as to why this book was chosen follow:

- This source has been approved by the Malaysian Ministry of Education.
- The level of the book is slightly above the average level of the Year Six.
- There are various sections which try to touch all the language skills.
- The students were familiar with the format of the book.
- The teacher was accustomed to teaching this book.

Author picked two parts in this book: *READ AND THINK*, and *LITERATURE*. Totally, there were 20 lessons in these two parts out of which nine were randomly selected. Afterwards, the TOEFL vocabulary were distributed in these nine reading texts based on the following criteria:

- The word itself appears in the text, like the words *geography*, *video*, etc.
  - The synonym of the word is there in the text, like the word 'ghost' for *phantom*.
  - The antonym of the word is there in the text, like the word 'bad' for *decent*.
  - A phonetically similar word is there in the text, like the word 'corridor' for *courier*.
  - The implications of the word can be deduced from the text.
- Table 2 shows how the words were distributed into each reading text.

**Table 2**

*Integration of the TOEFL Vocabulary into English Form 1*

Pages in	Vocabulary Integrated into the Text
<i>English Form 1</i>	
9	Philosopher, Conscious, Adjacent, Logic, Sympathy, Verbalize
45	Accretion, Passion, Frail, Contend, Chronicle
58	Exceed, Revive, Restrain, Verve
74-75	Ponder, Decent, Train, Categorize, Solitary, Refer, Geography
91	Format, Eligible, Deceive, Perennial, Infer
112	Minor, Graffiti, Dignity, Obstruct, Brevity
125	Phantom, Mental, Formulate, Vocal, Chronic, Video
163	Ensnare, Espionage, Fragment, Decorate, Describe, Amorous, Mention
193	Depict, Podium, Docile, Cognizant, Courier

#### 4.4 Research instrument

In order to evaluate the subjects' English vocabulary intake in both groups, Author adapted a 50-item multiple choice [TOEFL vocabulary test]. (n.d.). Furthermore, several local Malaysian teachers were consulted as to the degree of difficulty of this test. They unanimously agreed that almost all items were quite difficult or new to the Year Six students. This was in tandem with the previous studies such as (Hoshino, 2010; and Webb, 2009) in which the researchers made use of difficult, low-frequent, artificial, nonsense, or pseudo words in order to prevent participants' prior knowledge interference with the results.

## 5. Results

### 5.1 Introduction

A total of 130 Year Six Malaysian primary students in two public schools participated in the experiment. However, due to mortality effect some of them could not be accounted for in the final analysis. Thus, there were 118 students present in both pre and posttests: 21 boys and 33 girls in the treatment group; and 30 boys and 34 girls in the control group.

#### 5.2 Students' vocabulary gain scores

As stated in the design of this study, a 50-item TOEFL vocabulary test was administered to the students in both the treatment and control groups. The pre-test took place one session prior to the treatments, and the post-test was administered one session immediately after the treatments were over (after the 10<sup>th</sup> session). Consequently, each individual student's gain score was calculated. It should be mentioned that only right answers were marked; that is to say, unanswered test items or wrong answers were disregarded.

Since the statistical test used for this research question is an independent samples t-test, we should first see whether the assumptions for this test have been met or not. As this test relies on the t distribution, then there are three assumptions to be met; namely, independence of observations, normality of the distribution of the scores in the population, and the homogeneity of the variances. As stated earlier, the treatment samples and the control ones were randomly assigned into two different schools. Also the two instructors had no idea as to what teaching procedures and techniques the other teacher was applying. Moreover, the participants in each sample in the two schools did not know about the other one. Thus, the independence of observations has been fully maintained in this study. Then as for the normality of the distribution of the scores in the population is concerned, we should look at the descriptive statistics results including the K-S test as follows:

**Table 3**  
*Descriptive Statistics for the Eng. Voc. Gain Score*

		Statistic	Std. Error
Gain Score	Mean	5.6271	.40150
	Lower Bound	4.8320	
	95% Confidence Interval for Mean	6.4223	
	Upper Bound		
	5% Trimmed Mean	5.5857	
	Median	6.0000	
	Skewness	.060	.223
	Kurtosis	-.422	.442

As shown in Table 3, we can see that the mean of 5.6271 is very close to the median of 6.0000 in both groups. We can also look at the skewness statistics. Here, we can see that the skewness value of .060 is small relative to the standard error of .223, suggesting that the skewness is not a problem here. Also we can look at the kurtosis statistics. We can see that the kurtosis value of -.422 is also small relative to standard error of .442, suggesting that kurtosis is neither a problem in this analysis. However, as we can see in the Table 4, the K-S test shows a significant p value of .004 suggesting that the distribution of gain scores is not normal (the value should be larger than .05). Nonetheless, this is not a problem here either as we have a rather large sample. According to Gravetter and Wallnau (2002, p.263), "The normality assumption is not a cause for concern unless the sample size is relatively small. In the case of severe departures from normality, the validity of the t test may be compromised with small samples. However, with relatively large samples ( $n > 30$ ) this assumption can be ignored." Likewise, Stevens (1996, p. 242) has a similar vision. Therefore, we are allowed to ignore the normality issue for this t-test statistics.

**Table 4**  
*Tests of Normality for the First Research Question*

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gain Score	.103	118	.004	.983	118	.156

a. Lilliefors Significance Correction

Then in order to determine whether the assumption of the homogeneity of the variances has been met, we should investigate the results of the independent samples t-test as the following:

**Table 5**  
*Independent Samples t-test for the Gain Scores*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Gain Score	Equal variances assumed	.049	.825	3.659	116	.000	2.80440	.76634	1.28656	4.32224
	Equal variances not assumed			3.651	111.589	.000	2.80440	.76814	1.28236	4.32643

In Table 5 the significance value of the Levene's Test is .825 which is larger than .05. This means that the assumption of homogeneity of the variances of the scores for the population for this test has been met. Thus, we should use the first line in the table, which refers to "equal variances assumed". Therefore, in the current test we have  $t(116) = 3.66, p = .000$

As the  $p = .000$  is less than the required cut-off value of .05, we can conclude that there is a statistically significant difference in the English learning vocabulary gain score between the Malaysian Year Six primary school students under PLS and those under the conventional instruction. Thus, the null hypothesis has been rejected. Furthermore, as far as the direction of the difference is concerned, we can see from Table 6 (group statistics) that the mean English learning vocabulary gain score of 7.148 for the Treatment group under PLS is greater than the mean English learning vocabulary gain score of 4.343 for the control group under the conventional instruction. Thus, we can conclude that as the alternative directional hypothesis conveys, the Malaysian Year Six students who were taught with PLS have higher English vocabulary learning gain score than the Malaysian Year Six students who were taught with a conventional method.

**Table 6**  
*Group Statistics of the Gain Scores*

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Gain Score	1.00	54	7.1481	4.20874	.57274
	2.00	64	4.3438	4.09498	.51187

In the mean while, and as the first hypothesis is being explored, we need to calculate the effect size statistics which provides us with an indication of the magnitude of the differences between the two groups. There is a number of different effect size statistics among which the most commonly used is eta squared. Since SPSS does not provide eta squared values for t-tests, we should do the calculations on our own using the information provided in the output. The procedure for calculating and interpreting eta squared is as follow (Pallant, 2005):

Eta squared can be obtained using the following formula:

$$Eta\ Squared = \frac{t^2}{t^2 + (N - 1)}$$

$$Eta\ squared = \frac{3.66^2}{3.66^2 + (54 + 64 - 2)} = 0.10$$

According to Cohen (1988), the guidelines for interpreting this value are: .01=small effect, .06=moderate effect, .14=large effect. Thus, we can claim that the effect size of 0.10 for this test is rather a large effect. Then,

if we multiply this value by 100, we can have the percentage, meaning that 10 percent of the variance in English learning vocabulary gain score is explained by the two different treatments.

### 5.3. PLS and students' gender

Since the statistical test used for the second research question is also an independent samples t-test, we should first see whether the assumptions for this test have been met or not. As for the independence of observations, because of perfect formal test sessions both during the pretest and posttest, there were no ways in which any individual student could affect the other one's score. So, we can conclude that the assumption of independence of observations in this statistical test has been met. Furthermore, according to Stevens (1996, p.241), we had better set a more stringent alpha value (e.g.  $p \leq .01$ ) in such cases. Thus, the alpha value was set at .01 for this statistics.

Then, as for the normality of the distribution of the scores in the population is concerned, we should look at the descriptive statistics results including the K-S test as follows:

**Table 7**  
*Descriptive Statistics for Eng. Voc. Learning by PLS and Gender*

		Statistic	Std. Error
Gain Score	Mean	7.1481	.57274
	Lower Bound	5.6179	
	99% Confidence Interval for Mean	Upper Bound	8.6784
	5% Trimmed Mean	7.2675	
	Median	8.0000	
	Skewness	-.549	.325
	Kurtosis	.717	.639

In Table 7 we can see that the mean of 7.1481 is close to the median of 8.0000 in both groups. We can also look at the skewness statistics where we can see that the skewness value of -.549 is small relative to the standard error of .325, suggesting that the skewness is not a problem here. Then, we can look at the kurtosis statistics. We can see that the kurtosis value of .717 is just a little larger than the standard error of .639, suggesting that kurtosis is also not a problem in this analysis. Furthermore, as we can see in the Table 8, the K-S test shows a non-significant  $p$  value of .069 suggesting that the distribution of gain scores is not abnormal.

**Table 8**  
*Tests of Normality for the Eng. Voc. Learning by PLS and Gender*

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gain Score	.116	54	.069	.972	54	.231

a. Lilliefors Significance Correction

Nevertheless, the number of the boys in the treatment group (21 students) might seem questionable. However, according to Stevens (1996, p.72), "For social science research, about 15 subjects per predictor are needed for a reliable equation, i.e., for an equation that will cross-validate with little loss in predictive power." Thus, the number of the male students in the treatment group will not cause any problems.

Then, as in Table 9, the Significance value of the Levene's Test is .437 which is larger than .05; thus, we should use the first line in the table, which refers to "equal variances assumed". Therefore, in the current test we have  $t(52) = -.468, p = .642$ . As the  $p = .642$  is larger than the required cut-off value of .01, we can conclude that the null hypothesis has not been rejected. In other words, we can infer that there is not a statistically significant difference in the English learning vocabulary gain score between the Malaysian Year Six primary school male

and female students under PLS.

**Table 9**  
*Independent Samples t-test for Eng. Voc. Learning by PLS and Gender*

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	99% Confidence Interval of the Difference		
										Lower	Upper
Gain Score	Equal variances assumed	.614	.437	-.468	52	.642	-.55411	1.18360	-3.71875	2.61052	
	Equal variances not assumed			-.451	37.541	.655	-.55411	1.22859	-3.88763	2.77941	

In addition, we can calculate the eta squared for the above statistics as the following:

$$\text{Eta squared} = \frac{-0.468^2}{-0.468^2 + (21 + 33 - 2)} = 0.004$$

Based on Cohen (1988), we can claim that the effect size of 0.004 for this test is a very small effect. Then, if we multiply this value by 100, we can have the percentage, meaning that only 0.4 percent of the variance in English learning vocabulary gain score here is explained by the gender.

## 6. Discussion

### 6.1 PLS and learning English vocabulary

The data revealed that the Malaysian students who were taught with PLS had higher English vocabulary learning gain score. The independent samples t-test read  $t(116) = 3.66, p = .000$  which confirms a significant difference. Also, we can see from Table 6 that the mean English learning vocabulary gain score of 7.14 for the Treatment group is greater than the mean English learning vocabulary gain score of 4.34 for the Control group. Asking imaginative questions enables the teacher to encourage the students to somehow fit the new chunks of information (in the case of this study, vocabulary) into their pre-existing schemata. Author assumes that what actually happens in a PLS class surpasses the degree of abstractness which each individual's schemata contains. Not only is this in concord with Moseley et al. (2005)'s notion that cognitive restructuring involving the development of more sophisticated schemata is the natural outcome, Author believes that the sophistication may also be involved in the very process of learning, prior to and during the reconstruction.

Then, as far as the usage of L1 in learning English vocabulary is concerned, and based on the data of the current study, as well as the characteristics of PLS described earlier, the current findings are consistent with the works of Wolter (2001) and Celik (2003) in that students' mother tongue can play a crucial, and positive role in the process of language learning. Likewise, Jiang (2002) inspected the notion that L2 lexical forms are often mapped to the existing semantic content of their first language equivalents rather than to new semantic properties. The conclusion was that L1 semantic contents are present in L2 lexical entries. These findings are in contrast with the claims of advocates of language teaching methods or approaches such as the Direct Method, and the Audio-Lingual Method according to which students are strongly prohibited from using their mother tongue in the language classes.

On the other hand, the findings of the current study also agree with the claim of some studies such as (Brown, 2010; Mizumoto & Takeuchi, 2009) which have shown that new words in EFL/ESL setting can be stabilized more efficiently by heavier involvement load. In other words, the more the students "play" with the words, the longer they remember them. Likewise, students in PLS should try to make many imaginary associations amongst the words and their meanings and some of the synonyms, and this might be one of the main reasons that enables them to retain the vocabulary more efficiently. These findings also add to the research conducted by Van Daalen-Kapteijns et al. (2001), which studied how children drive the meaning of unknown words from multiple contexts. Both studies confirm that even young children are capable of performing meaning-derivation activities that are generally expected from more mature students. Here, Author would like to conjecture that perhaps younger students are even better, for children might have stronger imagination as compared to the older learners.

The findings of the present study may also provide remedies to the problem posed by Newton (2001).

In this research, it is argued that even though in task-based approaches, learners will often ignore difficult vocabulary in order to sustain communicative goals, such encounters can be turned to the learners' advantage. It means, instead of removing difficult words; teachers should consider a number of cooperative strategies to further expose learners to the new words. Similarly, most of the TOEFL vocabulary taught during the current experiment were low-frequent, abstract, or hard to conceive. This bears witness to the fact that it is practically possible to deal with difficult terms with imaginary usage of pictures. In other words, the 'exposure' as postulated by Newton needs not necessarily be a real one; it can be fantasized.

Also, PLS manoeuvres more on the productive skills; that is, speaking and writing. This is constant with the findings of Webb (2005) in which the use of productive vocabulary learning tasks over receptive ones is recommended. This is also in agreement with the findings of Barcroft (2004) in suggesting that when learning new words, sufficient processing resources should be allocated towards encoding the target word form. Moreover, the findings of the current study back up Webb (2009)'s recommendation to the English teachers in that they must encourage productive learning of vocabulary if they want to help students develop both receptive and productive knowledge.

### **6.2 Gender differences and applying PLS**

We can see in Table 9 that the t-test statistics on the male and female differences in learning the English vocabulary via the PLS method reads as:  $t(52) = -.468, p = .642$ . Thus, we can conclude that there is not a significant difference in the English learning vocabulary gain score between the Malaysian Year Six primary school male and female students under PLS. These findings agree with the report of the study conducted by Grace (2000) in which there was no difference between males and females concerning the performance on the receptive vocabulary tests, which would mean that males and females can equally benefit from CALL. Nevertheless, the limited quantitative data of the current study cannot provide the needed ground to specifically debate the findings of Yang (2001). Author acknowledges that the results of the vocabulary test do not imply simply as to how, and exactly through what learning processes the two genders scored nearly equally. In other words, it might be that, although the final results for both genders were almost the same, they could have used different strategies. Finally, the findings of the present study support the postulation of Varol and Yilmaz (2010) in that the recent researchers have the tendency to consider equal abilities between males and females with respect to language learning.

### **7. Conclusion**

This study showed that Pictologics (PLS) might be more efficient, at least to some extent, than the conventional method used in Malaysian schools. Moreover, being utilized by a local teacher, it became clear that this method can be practiced by the local teachers (teachers just need to be trained for a few hours which can also be done via training video films). Thus, Author suggests that applying the techniques of PLS, alone or in conjunction with the already existing conventional techniques in the Malaysian schools (and probably, elsewhere) be considered by the education authorities. Also, attempting to be pragmatic, Author believes that unnecessary exaggeration of technology and educational equipment (which are incredibly valuable indeed) is not the only solution. It is true that computers can be of great help, but who is going to do the thinking ultimately? What about feasibility and budget? The most money consuming part of implementing PLS is just printing the limited number of the picture cards; and once it is done, the pictures can be used for a very long period of time. Bearing in mind that there are also plenty of rural schools that may not have easy access to the technological developments, makes this of more importance. This study also revealed that there is almost no difference between the female and male students in benefiting from PLS. Thus, this method is applicable with no gender discrimination arguments, which makes it even more practical.

### **References**

- Barcroft, J. (2004). Can writing a new word detract from learning it? More negative effects of forced output during vocabulary learning. *Second Language Research* 22, 4, 487–497. <https://doi.org/10.1191/0267658306sr2760a>
- Barcroft, J. & Sommers, M. S. (2005). Effects of acoustic variability on second language vocabulary learning. *SSLA*, 27, 387–414. <https://doi.org/10.1017/S0272263105050175>
- Brown, D. (2011). What aspects of vocabulary knowledge do textbooks give attention to? *Language Teaching Research*, 15, 1, 83–97. <https://doi.org/10.1177/1362168810383345>
- Celik, M. (2003). Teaching vocabulary through code-mixing. *ELT Journal*, 57,4, 361–369. <https://doi.org/10.1093/elt/57.4.361>
- Chitravelu, N. & Sitravelu, N. & Saman, H. B. (2002). *English form 1*. Pahang: PTS Publications & Distributors Sdn.

Bhd.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.

Creswell, J. W. (2003). *Research design: qualitative, quantitative and mixed methods approaches* (2nd ed.). London: Sage Publications.

Donovan, M. S., & Bransford, J. D., & Pellegrino, J. W. (eds.) (2003). *How people learn: brain, mind, experience, and School*. Washington, D.C.: National Academy Press.

Grace, C. A. (2000). Gender differences: Vocabulary retention and access to translations for beginning language learners in CALL. *The Modern Language Journal*, 84,2, 214-224. <https://doi.org/10.1111/0026-7902.00063>

Gravetter, F. J., & Wallnau, L. B. (2002). *Statistics for the behavioral sciences* (4th edn). Belmont, CA: Wadsworth.

Greidanus, T. & Nienhuis, L. (2001). Testing the quality of word knowledge in a second language by means of word associations: Types of distracters and types of associations. *The Modern Language Journal*, 85,4, 567-577. <https://doi.org/10.1111/0026-7902.00126>

Halpern, D. F. & Sanders, B. R. (2004). *Teaching critical thinking skills across the curriculum*. (Participant Packet: December 1, 2004; 1:30 – 3:0 PM CT) STARLINK.

Hoai Huong, L. P. (2018). A survey study on academic vocabulary learning strategies by EFL university students. *Journal of Language Teaching and Research*, 9, 5, 1009-1016. <http://dx.doi.org/10.17507/jltr.0905.15>.

Hoshino, Y. (2010). The categorical facilitation effects on L2 vocabulary learning in a classroom setting. *RELC Journal*, 41, 3, 301-312. <http://doi.org/10.1177/0033688210380558>.

Hulstijn, J. (2001). Some empirical evidence for the involvement: load hypothesis in vocabulary acquisition. *Language Learning* 51:3, 539–558. <https://doi.org/10.1111/0023-8333.00164>

Jiang, N. (2002). Form-meaning mapping in vocabulary acquisition in a second language. *SSLA*, 24, 617–637. <https://doi.org/10.1017/S0272263102004047>

Jing, N. (2004). Semantic transfer and its implications for vocabulary teaching in a second language. *The Modern Language Journal*, 88, iii, 416-432. <https://doi.org/10.1111/j.0026-7902.2004.00238.x>

Jullian, P. (2000). Creating word-meaning awareness. *ELT Journal*, 54, I, 37- 46. <https://doi.org/10.1093/elt/54.1.37>

Kaushanskaya, M., Marian, V., & Yoo, J. (2011). Gender differences in adult word learning. *Acta Psychologica*, 137, 24-35. <https://doi.org/10.1016/j.actpsy.2011.02.002>

Kojic-Sabo, I., and Lightbown, P. M. (1999). Students' approaches to vocabulary learning and their relationship to success. *The Modern Language Journal*, 83, ii, 176-192. <https://doi.org/10.1111/0026-7902.00014>

Mirhosseini Chahardeh, S. M., & Khorasani, R. (2018). The effect of pre-teaching new vocabulary items via audio-visuals on Iranian EFL learners' reading comprehension ability. *International Journal of Research in English Education*, 3, 1, 19-27. DOI: 10.29252/ijree.3.3.19.

Mizumoto, A., & Takeuchi, O. (2009). Examining the effectiveness of explicit instruction of vocabulary learning strategies with Japanese EFL university students. *Language Teaching Research*, 13, 4, 425-449. <https://doi.org/10.1177/1362168809341511>

Moseley, D., Baumfield, V., Elliott, J., Gregson, M., Higgins, S., & Miller, J., et al. (2005). *Framework for thinking: a handbook for teaching and learning*. Cambridge: Cambridge University Press.

<https://doi.org/10.1017/CBO9780511489914>

Nasrollahi, K., & Samran D. (2018). The effect of visual contextual support and glossary of words on guessing meaning of new vocabulary items in English by pre-university male EFL students. *Journal of Language Teaching and Research*, 9, 3, 561-572. <https://doi.org/10.17507/jltr.0903.16>

Nemati, A. (2013). Vocabulary learning strategies: a short way to long term retention. *Linguistics and Literature Studies*, 1(1): 8-14. DOI: 10.13189/lis.2013.010102.

Newton, J. (2001). Options for vocabulary learning through communication Tasks. *ELT Journal*, 55/1, 30-37. <https://doi.org/10.1093/elt/55.1.30>

Pallant, J. F. (2005). *SPSS survival manual: a step by step guide to data analysis using SPSS*. Sydney, Ligare.

Phakiti, A. (2003). A closer look at gender and strategy use in L2 reading. *Language Learning*, 53, 4, 649-702. <https://doi.org/10.1046/j.1467-9922.2003.00239.x>

Rodriguez, M. and Sadoski, M. (2000). Effects of rote, context, keyword, and context/keyword methods on retention of vocabulary in EFL classrooms. *Language Learning* 50,2, 385–412. <https://doi.org/10.1111/0023->

[8333.00121](#)

Rojananak, K., & Vitayapirak, J. (2015). Comparison of English vocabulary learning strategies for good and weak learners at King Mongkut's Institute of Technology Ladkrabang. *International Journal of Languages, Literature and Linguistics*, Vol. 1, No. 1. 1-5. <https://doi.org/10.7763/IJLLL.2015.V1.1>

Rumelhart, D (1980). Schemata: The building blocks of cognition. In R. J. Spiro et al. (Eds.), *Theoretical issues in reading comprehension: perspectives from cognitive psychology, linguistics, artificial intelligence, and education*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Rumelhart, D., & Ortony, A. (1977). The representation of knowledge in memory. In R. C. Anderson, R. Spiro, & W. Montague (Eds.), *Schooling and the acquisition of knowledge*. Hillsdale, NJ: Lawrence Erlbaum.

Sagarra, N. and Alba, M (2006). The key is in the keyword: L2 vocabulary learning methods with beginning learners of Spanish. *The Modern Language Journal*, 90, ii, 228–243. <https://doi.org/10.1111/j.1540-4781.2006.00394.x>

Shintani, N. (2011). A comparative study of the effects of input-based and production-based instruction on vocabulary acquisition by young EFL learners. *Language Teaching Research*, 15, 137-158. <https://doi.org/10.1177/1362168810388692>

Stevens, J. (1996). *Applied multivariate statistics for the social sciences* (3<sup>rd</sup> ed.). Mahway, NJ: Lawrence Erlbaum Associates Publishers.

Stieglitz, E. L. (1983). A practical approach to vocabulary reinforcement. *ELT Journal*, 37, 71-75. <https://doi.org/10.1093/elt/37.1.71>

Tardieu, H., & Gyselinck, V. (2003). Working memory constraints in the integration and comprehension of information in a multimedia context. In H. V. Oostendorp (Ed.), *Cognition in a digital world*. London: Lawrence Erlbaum Associates, Inc.

Van Daalen-Kapteijns, M., Elshout-Mohr, M., and De Glopper, K. (2001). Deriving the meaning of unknown words from multiple contexts. *Language Learning* 51:1, 145–181. <https://doi.org/10.1111/0023-8333.00150>

Van Dijk, T., & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York: Academic Press.

Varol, B., & Yilmaz, S. (2010). Similarities and difference between female and male learners: Inside and outside class autonomous language learning activities. *Procedia Social and Behavioral Sciences*, 3, 237-244. <https://doi.org/10.1016/j.sbspro.2010.07.038>

Webb, S. (2005). Receptive and productive vocabulary learning: The effects of reading and writing on word knowledge. *SSLA*, 27, 33–52. <https://doi.org/10.1017/S0272263105050023>

Webb, S. (2009). The effects of receptive and productive learning of word pairs on vocabulary knowledge. *RELC Journal*, 40, 360-376. <https://doi.org/10.1017/S0272263105050023>

Wode, H. (1999). Incidental vocabulary acquisition in the foreign language classroom. *SSLA*, 21, 243-258. <https://doi.org/10.1017/S0272263199002053>

Wolter, B. (2001). Comparing the L1 and L2 mental lexicon: a depth of individual word knowledge model. *SSLA*, 23, 41–69. <https://doi.org/10.1017/S0272263101001024>

Yang, Y. (2001). Sex and language proficiency level in color-naming performance: An ESL/EFL perspective. *International Journal of Applied Linguistics*, 11, 2, 238-256. <https://doi.org/10.1111/1473-4192.00016>

Yilmaz, C. (2010). The relationship between language learning strategies, gender, proficiency and self-efficacy beliefs: a study of ELT learners in Turkey. *Procedia Social and Behavioral Sciences*, 2, 682-687. <https://doi.org/10.1016/j.sbspro.2010.03.084>